Pending Claims – Robertson
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1. A geminivirus silencing vector comprising a geminivirus genome comprising:

the geminivirus AL1, AL2 and AL3 coding sequences,

heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a gene endogenous to a plant that occurs naturally in the plant genome,

wherein said heterologous DNA is constitutively expressed and said AL1, AL2 and AL3 coding sequences are bidirectionally transcribed from said geminivirus silencing vector, and

wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

2. A vector according to claim 1, wherein said heterologous DNA replaces a segment of the coding sequence for the geminivirus coat protein.

3. A vector according to claim 1, wherein said heterologous DNA is operably associated with a promoter.

4. A vector according to claim 3, wherein said promoter is the promoter that is associated with said endogenous plant gene.

5. A vector according to claim 3, wherein said promoter is the geminivirus coat protein promoter.

6. A vector according to claim 1, wherein said heterologous DNA is in the sense orientation.

8. A vector according to claim 1, wherein said heterologous DNA has at least 80% sequence similarity to a fragment of said endogenous plant gene.

9. A vector according to claim 1, wherein said heterologous DNA has at least 80% sequence similarity to the entire coding region of endogenous plant gene.

11. The vector of claim 1, wherein expression of said heterologous DNA modifies a plant phenotypic trait.

12. A DNA construct comprising a geminivirus genome, wherein the DNA encoding the geminivirus coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to an endogenous plant gene that occurs naturally in the plant genome.

13. A DNA construct according to claim 12, wherein said heterologous DNA is operably associated with a promoter.

14. A DNA construct according to claim 13, wherein said promoter is the promoter that is associated with said endogenous plant gene.

15. A DNA construct according to claim 13, wherein said promoter is the geminivirus coat protein promoter.

16. A DNA construct according to claim 12, wherein said heterologous DNA is in the sense orientation.

18. A DNA construct according to claim 12, wherein said heterologous DNA has at least 80% sequence similarity to a fragment of said endogenous plant gene.

19. A DNA construct according to claim 12, wherein said heterologous DNA has at least 80% sequence similarity to the entire coding region of said endogenous plant gene.

21. The DNA construct of claim 12, wherein expression of said heterologous DNA modifies an observable plant phenotypic trait.

31. A plant cell comprising a geminivirus silencing vector according to claim 1.

32. A plant comprising a plurality of plant cells according to claim 31.

36. A geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a fragment of a gene endogenous to a plant, wherein the heterologous DNA sequence is inserted into the silencing vector in the sense orientation, and wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

37. The vector according to claim 36, wherein said gene endogenous to a plant occurs naturally in the plant genome.

38. A geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a coding region of a gene endogenous to a plant,

wherein the heterologous DNA sequence is inserted into the silencing vector in the antisense orientation, and wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

39. The vector according to claim 38, wherein said gene endogenous to a plant occurs naturally in the plant genome.

40. A DNA construct comprising a geminivirus genome, wherein the DNA encoding the geminivirus coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to a coding region of a gene endogenous to a plant, and wherein the heterologous DNA sequence is inserted into the geminivirus genome in the antisense orientation.

41. The DNA construct according to claim 40, wherein said gene endogenous to a plant occurs naturally in the plant genome.

42. A geminivirus silencing vector comprising a Tomato Golden Mosaic Virus (TGMV) genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a gene endogenous to a plant, wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

43. The vector according to claim 42, wherein said gene endogenous to a plant occurs naturally in the plant genome.

44. A geminivirus silencing vector comprising an African Cassava Mosaic Virus (ACMV) genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a gene

endogenous to a plant, and wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

45. The vector according to claim 44, wherein said gene endogenous to a plant occurs naturally in the plant genome.

46. A DNA construct comprising a Tomato Golden Mosaic Virus (TGMV) genome, wherein the DNA encoding the TGMV coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to an endogenous plant gene.

47. The DNA construct according to claim 46, wherein said gene endogenous to a plant occurs naturally in the plant genome.

48. A DNA construct comprising an African Cassava Mosaic Virus (ACMV) genome, wherein the DNA encoding the ACMV coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to an endogenous plant gene.

49. The DNA construct according to claim 48, wherein said gene endogenous to a plant occurs naturally in the plant genome.

50. A method of silencing the expression of an endogenous plant gene in a plant cell, comprising inoculating said plant cell with a geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a gene endogenous to a plant.

51. The method according to claim 50, wherein said gene endogenous to a plant occurs naturally in the plant genome.

52. A method of silencing the expression of an endogenous plant gene in a plant cell, comprising inoculating said plant cell with a DNA construct comprising a geminivirus genome, wherein the DNA encoding the geminivirus coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to an endogenous plant gene.

53. The method according to claim 52, wherein said gene endogenous to a plant occurs naturally in the plant genome.

54. A method of systemically silencing expression of an endogenous plant gene in a plant, comprising inoculating said plant with a geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA, said heterologous DNA having at least 80% sequence similarity to a gene endogenous to a plant.

55. The method according to claim 54, wherein said gene endogenous to a plant occurs naturally in the plant genome.

56. A method of systemically silencing expression of an endogenous plant gene in a plant, comprising inoculating said plant with a DNA construct comprising a geminivirus genome, wherein the DNA encoding the geminivirus coat protein has been replaced in part or in total with heterologous DNA having at least 80% sequence similarity to an endogenous plant gene.

57. The method according to claim 56, wherein said gene endogenous to a plant occurs naturally in the plant genome.

58. The vector of claim 11, wherein expression of said heterologous DNA modifies a plant phenotypic trait that can be visually observed.

60. The vector of claim 1, wherein said heterologous DNA has at least 90% sequence similarity to a gene endogenous to a plant.

61. The vector of claim 1, wherein said heterologous DNA has at least 95% sequence similarity to a gene endogenous to a plant.

62. A geminivirus silencing vector comprising a Tomato Golden Mosaic Virus (TGMV) genome comprising:

the TGMV AL1, AL2 and AL3 coding sequences operably associated with an AL1 promoter,

heterologous DNA, said heterologous DNA operably associated with a TGMV coat protein promoter and having at least 80% sequence similarity to a gene endogenous to a plant that occurs naturally in the plant genome,

wherein said heterologous DNA and said AL1, AL2 and AL3 coding sequences are bidirectionally transcribed from said geminivirus silencing vector, and

wherein said geminivirus silencing vector silences expression of the endogenous plant gene upon introduction into a plant cell.

63. A method of silencing the expression of an endogenous plant gene in a plant cell, comprising inoculating said plant cell with a geminivirus silencing vector according to Claim 42.

64. A method of silencing the expression of an endogenous plant gene in a plant cell, comprising:

providing a nucleic acid sequence encoding the geminivirus movement proteins to said plant cell;

inoculating said plant cell with a geminivirus silencing vector comprising a geminivirus genome which contains heterologous DNA having at least 80% sequence similarity to a gene endogenous to a plant.

65. The method of Claim 64, wherein said plant cell is a cell from a species of *Nicotiana* and said geminivirus silencing vector is a Tomato Golden Mosaic Virus (TGMV) silencing vector.